245.80

Water Testing

Overview

Introduction

Drinking water contaminated with bacteria (total coliform and/or *E.coli*) or nitrate may pose a health risk, especially for infants. In order to reduce health risks, the Iowa Department of Public Health and Iowa Department of Natural Resources Grants to Counties Water Well Program and the State Hygienic Laboratory offer a drinking water-testing program to WIC participants with private wells.

Contact county sanitarian

To refer a participant for water testing you will need to contact the local county sanitarian. To locate the local sanitarian in your area go to: https://idph.iowa.gov/ehs

Marshall County

In Iowa 98 out of 99 counties participate in the Grants to Counties Water Well Program. Marshall county is the only county that currently does not participate. An agency serving Marshall County will receive water testing kits directly from the State Hygienic Laboratory. WIC staff will distribute the kits to the WIC participant who will then be responsible for water collection. The State Hygienic Laboratory will provide technical assistance to the agency and participants. For technical assistance call the water lab at 319-335-4366.

Unusual cases

There may be other unusual situations where a participant may not qualify for well water testing or a county may use up all of their funding. If a case such as this arises, please contact the state WIC office for individual assistance.

Fluoride testing

Drinking water can be an important source of fluoride, which helps prevent dental caries, or tooth decay. See Policy 240.90 for information about testing for fluoride and recommendations on fluoride supplementation.

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Overview, Continued

In this policy This policy covers the following topics.

Bacteria and Nitrate

Hazards of bacteria- and nitrate-contaminated water

Drinking water from contaminated private wells may be a source of water borne-illness, especially for infants.

Bacteria (total coliform): Total coliform bacteria are microorganisms that are present in soil and in sewage. The presence of these microorganisms in drinking water indicates a possible sanitary defect in the drinking water system (e.g. well or plumbing). This defect may provide an opportunity for harmful material to enter the drinking water which represents a potential health hazard. If the laboratory also tests for *E.coli*, the presence of this microorganism indicates that the water may be contaminated with sewage and represents a serious health concern.

Nitrate: Nitrate is a chemical compound that is found naturally in the soil and in many foods. All sources of nitrogen are potential sources of nitrate (e.g. nitrogen fertilizers, sewage, animal manure, etc.). There is a potential health risk to infants under six months of age when drinking water containing elevated amounts of nitrate is used to mix formula or juice. The life-threatening disease is called methemoglobinemia, or "blue-baby" syndrome. Nitrate contaimination is more likely to occur in shallow wells and in wells which are poorly located, constructed, or maintained.

Effects of nitrate

Methemoglobinemia occurs in infants who ingest a high concentration of nitrate because their digestive systems are conducive to the growth of bacteria that convert nitrate to nitrite. The high concentration of nitrite in the blood converts hemoglobin to methemoglobin, which reduces the oxygen-carrying capability of the blood. When 20 percent of the hemoglobin is converted to methemoglobin, the infant can become cyanotic and respiratory problems may occur.

Determining need for testing

Questions to determine the need for testing the private well water supply are included in the diet history questionnaires.

Breastmilk not affected by nitrate in water

Elevated nitrate levels in the mother's drinking water supply have no demonstrated effect on nitrate levels in breastmilk.

Testing for Bacteria and Nitrate

County well specialist

Prior to referring a participant to the county sanitarian for a water test, the local agency must confirm referral procedures with the county specialist. Then follow these steps.

Step	Action
1	Generate a referral form and have the participant sign it.
2	Call the county specialist with the referral to collect the sample and follow-up by mailing the printed referral.
3	Follow-up with the participant and request a copy of the test results that they receive from the county specialist.
4	Follow your agency's policy for any other needed follow-up.
5	Enter participant's name, date, WIC participant type, and sample collection information in the water testing log (see sample-page 7).

Results of Tests for Bacteria and Nitrate

Receiving and recording test results

The county sanitarian or laboratory will send the results of the test to the participant. Request a copy of the test results from the participant and record the results of the test in the water-testing log. The sanitarian or county well program specialist may send results if the agency requests them.

Interpreting bacteria test results

The results of the bacteria analysis will be reported by the laboratory as either present or absent or will give the relative amount of total coliform bacteria in a water sample, and reported in terms of "Most Probable Number" (MPN).

The results will be reported as either present or absent or as an MPN number in a range from <1 to 200 MPN per 100 milliliter. A drinking water sample result of "present" or "greater than or equal to 1" is considered a positive result for total coliforms in the water supply. Total coliforms do not cause illness, but are an indication that a sanitary defect exists in the water system and may provide a pathway for harmful material such as fecal waste, surface water, or other contamination to enter the water supply. Drinking water containing total coliform bacteria is considered contaminated and should not be used for human or infant consumption unless properly disinfected before use.

Interpreting nitrate test results

The presence of nitrate in water will be expressed in the laboratory report as Nitrate (NO_3)or Nitrogen-Nitrate ($N\text{-}NO_3$).

Cases of methemoglobinemia in infants would not be expected from concentrations lower than 90 mg/l, but at concentrations between 45 and 100 mg/l there may be some increased risk of methemoglobinemia. Therefore, a nitrate concentration of 45 mg/l as NO_3 (or 10 mg/l as N) is the maximum contaminant level permitted for public water supplies. Test results for water samples from WIC participants will be compared to that level. This provides a sufficient safety factor in the event of fluctuating nitrate concentrations.

Reporting test results to state office

Agencies will forward the data from their logs to the state WIC office for tabulation of statewide data. Enter the results from your water-testing log on a Water-Testing Summary and send it to the state WIC office yearly, as requested.

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Results of Tests for Bacteria and Nitrate, Continued

Test results and recommend-ations

The nutritionist or nurse will interpret the test results to participants, and give any necessary instruction or follow-up. The following table summarizes the possible test results and the corresponding recommendations that should be given to the participant.

WHEN bacteria result or level (MPN) is...	AND nitrate level (mg/l) is...	THEN water quality...	AND recommended follow-up action is...
Absent or <1	less than 45 as NO3 Or less than 10 as N	is acceptable (safe).	none
Absent or <1	45-100 as NO3 Or 10-20 as N	is acceptable but presents increased risk of methemoglobinemia	refer to sanitarian or Board of Health (BOH) for well inspection
Absent or <1	more than 100 as NO3 Or More than 20 as N	is unacceptable for infants up to six months old	• recommend alternative safe water supply, and • refer to sanitarian or BOH for well inspection.
Present or >1	less than 45 as NO3 Or Less than 10 as N	is contaminated with bacteria	• boil all drinking water for at least one minute before use, and • refer to sanitarian or BOH for well inspection.
Present or >1	more than 45 as NO3 Or More than 10 as N	is contaminated with bacteria and presents increased risk of methemoglobinemia	• recommend alternative safe water supply, and • refer to sanitarian or BOH for well inspection.

Do not boil water with nitrate

Instruct participants **not** to boil water with elevated nitrate levels for use as drinking water. Boiling raises the level of nitrate by the process of evaporation.

Alternatives

See page 9 for information on alternative water supplies.

Referrals for contaminated water

If water testing indicates that a well is contaminated with bacteria or nitrate, contact:

- Environmental health professional for that county, or
- Iowa Department of Natural Resources at (515)725-0462, or
- Iowa Department of Public Health at 515-281-7726 or https://idph.iowa.gov/ehs/grants-to-counties

Documenting Water Testing Activities and Results

Introduction

Water testing activities are reported to the state WIC office to track trends in the results and follow-up. A summary is compiled and sent to the Bureau of Environmental Health Services.

Completing the Nitrate/Bacteria Water-Testing Log

Follow the instructions in the table below to assure that accurate information is reported.

Step	Action
1	Record the requested information on the log each time a family is referred to the county well program specialist/sanitarian for water testing. The information includes: • Name and family number of the participant for whom the test is authorized, • Date a referral is made, • WIC Code,* and • Mark if the county well program or other entity completed the water testing. *See the bottom of each form for the response codes and their definitions.
2	Record the test results when they are returned to your agency regardless of who completed the analysis.
3	Record any referrals made for follow-up of positive test results.
4	Record information about the alternate water supply that will be used until the problem has been resolved.

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Documenting Water Testing Activities and Results, Continued

Completing the Water-Testing Summary

The Water-Testing Summary for the state fiscal year (July 1-June 30) should be compiled from the information on the Nitrate/Bacteria Water-Testing Log forms and submitted to the state WIC office within 60 days of the close of the year (by September 30). The summary must be completed and submitted even if no kits were issued. Be sure to draw a line on the log form or start a new page to assure that information is not reported twice. Follow the steps in the table below to assure that accurate information is provided.

Step	Action
1	Fill out the agency name and number, date and name of staff member completing the Water-Testing Summary.
2	Count and document the number of participants by participant type referred to the county well program.
3	If someone other than a county well program is used, identify the program and number of times they were used.
4	Record the test results.
5	Record any follow-up for positive test results.
6	Provide any additional comments as needed.

Alternative Water Supplies

When to recommend alternative water supply

If water tests indicate that well water is contaminated with bacteria or nitrate, the nurse or nutritionist should recommend an alternative water supply such as public water or bottled water.

Public water supplies

Public water supplies such as rural water systems or city water meet standards for bacteria and nitrate unless the public has been notified otherwise. The participant may check with city officials if there are any questions.

Bottled water

Bottled water should be chosen carefully. It is not as vigorously monitored as public water supplies. The participant should take the following precautions to ensure that bottled water is safe for drinking:

- Use bottled water clearly labeled as "drinking water," "for human consumption," or "bottled according to FDA standards."
- Ask the bottled water distributor for a written statement guaranteeing that nitrate levels in the water do not exceed 10.0 mg/l as nitrogen.

Note: Most bottled water does not contain significant fluoride. Families need to ask their physician or dentist about other sources of fluoride if bottled water is used for prolonged periods.

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